Abstract Submitted
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Normal modes of small complex plasma disks K.D. WELLS, T.E. SHERIDAN, Physics, Ohio Northern University — Center-of-mass and breathing oscillations of a complex (dusty) plasma disk are excited for $n = 3$ and 5 microspheres (9.62μm diam) with neutral argon pressures $P \approx 1-4$ Pa. The mode frequencies and damping rates are determined directly from measured resonance curves. Millikan's coefficient for the Epstein drag force, the Debye length and the particle charge are determined by comparison with theory. The damping rates are the same for both modes and for $n = 3$ and 5 particles, as predicted. Millikan's coefficient is found to be $\delta = 1.55 \pm 0.16$, in agreement with $\delta = 1.44$ for diffuse reflection. A consistent value of the Debye length that decreases with pressure is found for $n = 3$ and 5 particles. The particle charge for $n = 3$ particles is found to be more negative than that for $n = 5$ particles for the same conditions, indicating that the effective ion collection area of the particles increases as their separation decreases.

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